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NOTES ON GEOGRAPHIC DISTRIBUTION

Fish, *Ichthyomyzon bdellium, Ichthyomyzon greeleyi, Noturus flavus, Moxostoma breviceps, Lythrurus umbratilis, Notropis buccatus, Misgurnus anguillicaudatus, Morone americana, Lepomis cyanellus, Ammocrypta pellucida*: Distribution extensions

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Conewango Creek drains approximately 2,325 km^2 in southwestern New York and northwestern Pennsylvania, U.S.A. It is part of the Allegheny River watershed, which drains into the Mississippi River drainage through the Ohio River. The first synoptic survey of the fishes of the basin occurred in 1937 (Greeley 1938). After this initial survey, workers from the state management agency (New York State Department of Environmental Conservation (DEC)), colleges, environmental organizations and museums collected information on fish distribution episodically during the next seven decades. Carlson et al. (1999) compiled and updated this earlier information on the status of fishes and listed 69 species from the basin. In a survey conducted in 2004 and 2005, Daniels et al. (2006) collected representatives of ten species not previously reported from the streams of the basin.

In areas where surveys are conducted regularly, the discovery of a range extension of a species usually is an indication that an exotic species has been introduced. More unusual in modern survey work is the discovery of what appear to be native species in areas that are disjunct from other sites of known occurrence. Seven of the species previously unreported in this basin are fishes, most of them small species, which probably gained access to the Conewango Creek system by migrations from downriver sources. Five of these species are native to the watershed, but their presence in this basin has not been noted in published accounts. Two species are native in the Allegheny River downstream of this basin and native to the neighboring Saint Lawrence River drainage; their recent capture in the Conewango Creek basin is the first record of them in the New York portion of the Allegheny River watershed. These are important range extensions for these seven species and they are not likely the result of an introduction because none is regionally important either for commerce or recreation. The remaining three species are introduced and have extended their ranges within the basin from their introduction site within the last decade.

PETROMYZONTIDAE: *Ichthyomyzon bdellium* (Jordan, 1885), Ohio lamprey, and *Ichthyomyzon greeleyi* Hubbs and Trautman, 1937, mountain brook lamprey, are endemic to the Ohio River watershed of the Mississippi River drainage (Lee et al. 1980 et seq.). Cooper (1983) noted their presence at several sites in the Allegheny River watershed in Pennsylvania, downstream and upstream of the New York river reach. Smith (1985) extended the range of Ohio lamprey into the New York portion of the Allegheny River and French Creek based on specimens collected in the 1960s and 1970s. We collected a 171 mm total length adult (NYSM 58637) in Conewango Creek approximately 38 km upstream of its mouth on 29 June 2005. Previously, a 230 mm adult was collected in Conewango Creek in 2001 (NYSM 52655). An adult mountain brook lamprey, 135 mm total length (NYSM 59328), was collected in the west branch of Conewango Creek on 21 April 2005. Ammocoetes were collected at three sites in Conewango Creek and its west branch in May and September 2001 and October 2004 and in Stillwater Creek at two sites in 2000 and 2002. These may be either Ohio or mountain brook lamprey, but are only identified as *Ichthyomyozon* sp. because of the difficulty in separating Ohio from its nonparasitic congener mountain brook lamprey. All were collected at stream sites with maximum water depths exceeding 1 m and with pool conditions and fine-sediment substrates present. Ohio lamprey and mountain brook lamprey in Conewango Creek are on the periphery of their ranges and are relatively rare. Mountain brook lamprey was first reported in other basins

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of the New York portion of the Allegheny River watershed in 1937 and is a species of special concern in New York.

ICTALURIDAE: *Noturus flavus* Rafinesque, 1818, stonecat, occurs throughout the Allegheny River watershed in western Pennsylvania (Cooper 1983) and New York (Smith 1985). It is widely distributed throughout the Mississippi River and Great Lakes drainage (Lee et al. 1980 et seq.). It has not been reported in the Conewango Creek basin previously. We collected it at two sites, both in Stillwater Creek, a downriver tributary to Conewango Creek. Both sites were characterized by gravel-rubble substrate and dominated by riffle or run habitats.

CATOSTOMIDAE: *Moxostoma breviceps* (Cope, 1870), smallmouth redhorse, was captured in a deep, downstream reach of Conewango Creek. This species has been collected in the Allegheny River and French Creek, but had previously not been reported from this basin. It is widely distributed in the Ohio River watershed (Lee et al. 1980 et seq.) and Cooper (1983) noted its presence in the lower Allegheny River watershed in western Pennsylvania. Because of the difficulty in sampling these deeper, main channel habitats, smallmouth redhorse may have been overlooked in previous surveys.

CYPRINIDAE: *Lythrurus umbratilis* (Girard, 1857), redfin shiner, is widely distributed throughout the Mississippi River drainage and in tributaries of the Great Lakes (Lee et al. 1980 et seq.). In New York, it was historically present in Lake Ontario, Lake Erie, Niagara River and their tributaries (Smith 1985; Carlson and Daniels 2004), although there are no recent collections from tributaries to Lake Erie. Cooper (1983) verified two sites in the French Creek basin, but well downstream of New York. Consequently, this species has not been reported from the Allegheny River watershed in New York. We collected four individuals (NYSM 58627, 58902) from two sites on Cassadaga Creek, the major western tributary of Conewango Creek. The upstream site was approximately 10 km from the downstream site. The stream at these sites was primarily a run-pool habitat, relatively deep (maximum greater than 1.5 m) and with water velocity reaching 70 cm/sec. Substrates were dominated by mud and sand. Redfin shiner populations in New York are on the periphery of its range and this is a species of special concern in this state, although it is unprotected elsewhere (Carlson 2001). The discovery of this species in the Conewango Creek basin is unexpected. There are no reports of this species in the main channel of either Conewango Creek or the Allegheny River downstream of these collections.

Notropis buccatus (Cope, 1865), silverjaw minnow, was described from specimens collected in a tributary of the Allegheny River approximately 185 km downstream of the Conewango Creek confluence. This species is widely distributed in the Allegheny River and its tributaries, including French Creek and Brokenstraw Creek, in western Pennsylvania (Cooper 1983), but had not been recorded in the New York part of the watershed until captured in 1979 (Smith 1985). Carlson et al. (1999) reconfirmed that silverjaw minnow in New York was confined to French Creek and tributaries of Brokenstraw Creek and noted more recent sightings. We collected an individual (NYSM 57288) in the west branch of Conewango Creek, approximately 75 km upstream of the confluence with the Allegheny River. The stream at this site was a deep pool-run with coarse substrate. This species is on the periphery of its range and rare in New York. The discovery of silverjaw minnow in Conewango Creek is not unexpected because it is ubiquitous in western Pennsylvania and present in the upstream sections of the other Allegheny River tributaries in New York. It is interesting that it was collected so far upstream, however.

COBITIDAE: *Misgurnus anguillicaudatus* (Canton, 1842), oriental weatherfish, is an obvious exotic introduction. It was first collected in 2001 in Cheneys Road Marsh of Ball Creek, a tributary to Chautauqua Lake. We collected two individuals (NYSM 57313) 2 km downstream of the marsh in a section of stream with alternating riffle-pool and dominated by rubble substrate. This suggests that a downstream dispersal of the fish is underway and this site is approximately 2 km upstream of Chautauqua Lake. Oriental weatherfish are established in several states (Fuller et al. 1999) and now appear to be

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established in New York. The reason for the introduction and the effect it will have on the fish assemblage is not known.

MORONIDAE: *Morone americana* (Gmelin, 1789), white perch, was introduced into lakes in the basin in the 1980s and 1990s (Carlson et al. 1999). We collected 17 individuals (NYSM 58800) from a backwater of Cassadaga Creek. White perch was also taken in Conewango Creek approximately 10 km downstream of the Cassadaga Creek confluence. The sites were characterized by deep, slow-moving water. The substrate was predominately mud. The associated fish assemblages included several other centrarchids and gizzard shad, another species introduced into Chautauqua Lake (McKeown 2000). The presence of this species in the streams of the Conewango Creek system is the result of downriver migration from the lake; this site is approximately 20 km downstream of the lake.

CENTRARCHIDAE: *Lepomis cyanellus* Rafinesque, 1819, green sunfish, is expanding its range in New York (Carlson and Daniels 2004). We found this species at four sites, all tributaries to Chautauqua Lake, which suggests that the lake is key to the introduction. These are the first vouchered specimens of green sunfish from the Conewango Creek basin, but it has been reported in the Allegheny River watershed (Carlson and Daniels 2004) and it is widely distributed in the lower part of the watershed in western Pennsylvania (Cooper 1983).

PERCIDAE: *Ammocrypta pellucida* (Agassiz, 1863), eastern sand darter (Figure 1), was present at eight sites on Conewango Creek for a distance of approximately 22 stream km beginning just upstream of the state border. It is also present in Stillwater Creek, a tributary entering Conewango Creek in this reach. Downriver is a slow moving, meandering stretch that is deep, turbid and dominated by a clay, mud and sand substrate. Habitat at the most upstream site was characterized by higher gradient and water velocity, dominated by riffles and pools and with gravel and rubble dominating substrates. Eastern sand darter was collected downstream of riffles on sand beds, under flowing water about 75-150 cm deep. The number of darters taken at each site ranged from 1 to 6. Eastern sand darter has a wide distribution (Lee et al. 1980 et seq.) and it occurs in several watersheds of the Saint Lawrence River drainage in New York (Carlson and Daniels 2004), but is rare in this state, which is at the northeastern edge of its range and is listed as threatened (Carlson 2001). It has never been reported in the Allegheny River watershed of New York, but Cooper (1983) noted its presence in French Creek, which enters the Allegheny River approximately 90 km downstream of Conewango Creek. It was surprising to find eastern sand darter in a watershed where it was not historically reported, and more surprising that it occurred over a long stretch of the stream. This is a species that requires silt-free sand beds (Daniels 1993) and its presence indicates that conditions in Conewango Creek are such that a secure source of clean sand is available and periodically replenished.

Figure 1. *Ammocrypta pellucida*, eastern sand darter. Mettawee River, New York, 1984.

Discussion

Conewango Creek and its tributaries have been surveyed frequently since the 1930s (Carlson et al. 1999). An increase in richness of ten species is surprising in a stream system where stream surveys occur recurrently. Possible reasons for such an increase in species richness include introductions of exotic species, natural range extensions or inadequate sampling in previous surveys. The discovery of exotic species is becoming increasingly more common in survey work, and the future results of these introductions are difficult to assess. Exotic species, such as oriental weatherfish, white perch and green sunfish, are introduced for a variety of reasons, often without sanction. The oriental weatherfish may have been an aquarium or bait-bucket release. White perch and green sunfish may have been introduced in a misguided effort to improve the Chautauqua Lake fishery; neither introduction

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was vetted by the management agency responsible for the fishery.

Conewango Creek is a large, slow, deep and turbid stream and difficult to sample with traditional small river devises, such as seines and backpack electroshockers. Streams that are difficult to sample require additional effort in sampling. It is possible that some of the seven species that we regard as native to the drainage have been present in the system for some time, but were simply overlooked. We used several different devices in our sampling effort (see Daniels et al. (2006) that may have allowed us to capture fishes not easily captured otherwise.

Finally, although the nearest populations of the seven native species were many km downriver of the Conewango Creek confluence, conditions within the watershed may have changed and allowed or even promoted their dispersal into the basin. A more thorough survey may suggest possible dispersal routes and may identify environmental changes promoting fish dispersal. It is encouraging that suitable conditions exist in Conewango Creek to support three species that are rare and protected in New York, particularly if these species have recently expanded their ranges.

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